CLAIMS

1. An optical device formed in a semiconductor layer, the optical device comprising:

a first doped region having an first conductivity type;

a second doped region having a second conductivity type;

a first light absorbing region interposed between the first and second doped regions;

a third doped region having the first conductivity type;

a second light absorbing region interposed between the second and third doped regions;

a fourth doped region having the first conductivity type interposed between the first light absorbing region and the second doped region; and

a fifth doped region having the first conductivity type interposed between the second light absorbing region and the second doped region.

2. The device of claim 1 wherein the device is a lateral device.

3. The device of claim 1 wherein the fourth doped region is adjacent to the second doped region.

4. The device of claim 1 wherein the fourth doped region is more lightly doped than the first doped region.

5. The device of claim 1 further comprising:

a sixth doped region having the second conductivity type interposed between the first doped region and the light absorbing region.

6. The device of claim 5 wherein the sixth doped region is adjacent to the first doped region and the fourth doped region is adjacent to the second doped region.

7. The device of claim 5 wherein the sixth doped region is more lightly doped than the second doped region.

8. The device of claim 5 wherein the fourth doped region and the sixth doped region are doped with approximately a same concentration.

9. The device of claim 1 wherein the semiconductor substrate comprises silicon.

10. The device of claim 1 further comprising processing circuitry formed in the semiconductor substrate.

11. The device of claim 10 wherein the processing circuitry comprises gates and interconnects and source and drain regions.

12. The device of claim 1 further comprising a light-barrier layer overlying the first, second, and third doped layers.

13. The device of claim 12 wherein the light-barrier layer comprises a reflective metal.

14. The device of claim 12 wherein the reflective metal comprises silicide.

15. The device of claim 1 wherein the first conductivity type is P-type and the second conductivity type is N-type.

16. The device of claim 1 wherein the first and third doped regions are substantially parallel to each other and are electrically connected.

17. The device of claim 16 wherein the first, second, and third doped regions are interleaved.

18. The device of claim 1 further comprising a grating formed over at least a portion of the first light absorbing region.

19. The device of claim 1 further comprising an insulating layer beneath the first light absorbing region, wherein the grating, the first light absorbing region, and the insulating layer form a waveguide portion.

20. An optical device formed in a semiconductor layer, the optical device comprising:

a first doped region having an first conductivity type;

a second doped region having a second conductivity type;

a first light absorbing region interposed between the first and second doped regions; and

a light-barrier layer overlying at least one of the first and second doped regions.

21. The device of claim 20 wherein the light-barrier layer comprises a reflective metal.

22. The device of claim 21 wherein the reflective metal comprises silicide.

23. The device of claim 20 further comprising a grating formed over at least a portion of the first light absorbing region.

24. The device of claim 20 further comprising an insulating layer beneath the first light absorbing region, wherein the grating, the first light absorbing region, and the insulating layer form a waveguide portion.

25. The device of claim 20 further comprising a third doped region having the first conductivity type interposed between the light absorbing region and the second doped region.

26. A method of forming an optical device comprising:

providing a semiconductor substrate;

forming a first doped region within the semiconductor substrate which has a first conductivity type;

forming a second doped region within the semiconductor substrate which has a second conductivity type;

providing a light absorbing region interposed between the first and second doped regions; and

forming a light-barrier layer overlying at least one of the first and second doped regions.

27. The method of claim 26 further comprising forming a third doped region having the first conductivity type interposed between the light absorbing region and the second doped region.

28. The method of claim 27 wherein the third doped region is formed adjacent to the second doped region.

29. The method of claim 26 further comprising forming a transistor within the semiconductor substrate.

30. The method of claim 29 further comprising forming a silicide layer over a portion of the transistor, wherein at least a portion of said forming the silicide layer is performed concurrently with said forming a light-barrier layer.

31. The method of claim 26 wherein the light-barrier layer comprises a reflective metal.

32. The method of claim 26 wherein the reflective metal comprises silicide.